ASKAR'YAN, G.A.

Decrease of the penetrating power of intense light due to scattering by refracting halos caused by the optical disturbance of the medium near inhomogeneities. Zhur. eksp. i teor. fiz. 45 no.3:810-812 S '63. (MIRA 16:10)

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1. Fizicheskiy institut imeni P.N. Lebedeva AN SSSR.
(Light—Scattering) (Light—Transmission)

s/0056/64/046/001/0403/0405

ACCESSION NR: AP4012574

TITLE: Excitation and dissociation of molecules in an intense AUTHOR: Askar'yan, G. A.

SOURCE: Zhurnal eksper. i teoret. fiz., v. 46, no. 1, 1964, 403-405 light field

molecule dissociation, intense light, intense modulated light, excitation probability, homopolar molecule, heteropolar molecule, homopolar molecule dissociation, heteropolar molecule dissociation, heating of molecule, resonance interaction, nonresonance in-TOPIC TAGS

ABSTRACT: The possibility of and conditions for efficient direct dissociation of molecules in a very intense light field is indicated, teraction and the magnitude of the effect is estimated by means of simple quasiclassical calculations. In the case of homopolar molecules it

Card 1/3

ACCESSION NR: AP4012574

is shown that for an atomic mass $\approx 10^{-24}$ g, a natural vibration frequency $\approx 10^{15}$ sec 1, and a field of 10^7 V/cm the molecule breaks up within $\approx 10^{-10}$ sec at resonance (when the external pulsation frequency approaches the natural frequency). The differences between non-resonance and resonance interaction are examined as functions of the mutual positions of the interacting atoms and the direction of the electric vector of the light wave. The dissociation of heteropolar molecules, under similar conditions, should be more intense. It follows from the analysis that an intense light field with resonance carrier or modulation frequencies can be used for effective excitation and dissociation of molecules. Possible applications are intensification of the effect of light on molecular media or or nicroobjects, dissociation of fast atoms or ions entering a trap, production of an atomic beam from a molecular beam, direct heating of molecules of a medium, etc. Orig. art. has: 5 formulas.

Card 2/3

ACCESSION NR: AP4C12574

ASSOCIATION: Fizicheskiy institut im. P. N. Lebedeva AN SSSR (Physics Institute, AN SSSR)

SUBMITTED: 15Nov63 DATE ACQ: 26Feb64 ENCL: 00

SUB CODE: PH NO REF SOV: 002 OTHER: 000

ACCESSION NR: AF4019255

ACCEDITOR IIII

da. M. S.

AUTHORS: Askar'yan, G. A.; Delone, T.

e beams in a

TITLE: Action of intense light on with magnetic trap

SOURCE: Zhurnal eksper. i teor. f

· 164, 814-816

TOPIC TAGS: plasma, magnetic trap, h g t ght, plasma contion, ionization by light flash, trap is ght, plasma confinement, ion dissociation, molecule dissociation

ABSTRACT: The paper evaluates the specific of filling magnetic traps with fast ions produced by in a magnetic field and matter by a powerful flash of the particles entering (2) the action of intense light amount property by N. G. Basov and O. the trap.

N. Krokhin is shown

Cord 1/3

ACCESSION NR: AP4019255

(ZhETF, v. 46, 171, 1964) to heat the ions through electron collisions in a focused beam of conerent wight has low efficiency and that it is better to have the ice's produced by the light directly, and not through the intermediccy of the electrons. The resultant ion energy is estimated to be approximately 10 times thermal, and in view of the small initial dimensions of the heated region the plasma can be confined by means of a pulsed magnetic field. The second method is based on a recently established fact that a focused beam of coherent light exerts 5 cong ionizing action on a rarefied, gas (E. Damon and R. Tomlins ... Applied Optics, v. 2, 546, 1963; F. V. Bunkin and A. M. Prokl prov. ZhETF, v. 46, 1090, 1964). The fact that the ionization probability increases exponentially with the power of the light (W ~ e^{BP} , where B = ~3 x 10^{-2} kW⁻¹) favors effective ionization of even fast particles. It is shown that the strong electric field of the coherent light can be used also to dissociate or ionize molecular ions in addition to ionizing neutral atoms following their entry into the trap. Further research is

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ACCESSION NR: AP4019255

therefore urged, aimed at theoretical and experimental studies of ionization and dissociation of molecules and molecular ions in a strong light field. Orig. art. has: 1 formula.

ASSOCIATION: Fizicheskiy institut im. P. N. Lebedeva AN SSSR (Physics Institute, AN SSSR)

SUBMITTED: 20Nov63

/ DATE ACQ: 27Mar54

ENCL: 00

SUB CODE: PH

NO REF SOV: 004

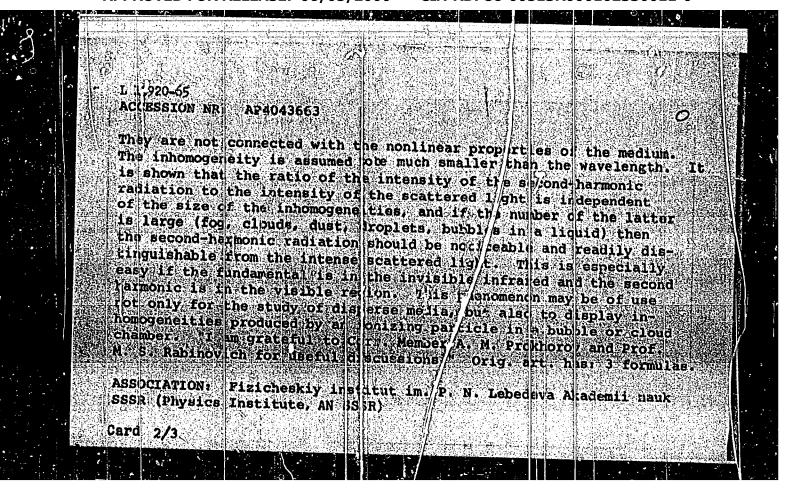
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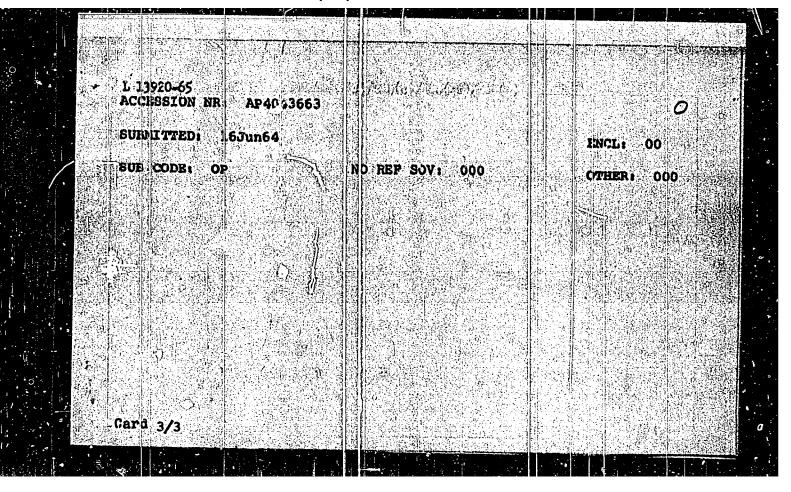
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CIA-RDP86-00513R000102330011-0"

	L 13010-65 BSD/SSD/APVL/RAPM())/SSD(i)/ESD(50)/SSD(4/041/002/0782/0782	
	AUTHOR: Askar'yah, G. A.	Western
	TITLE Second harmonic radiation from inhomographics in an intense	Constant
	BOUR E: Zi. ekuper. i teor fiz., v. 47, no. 1961, 782	Sauly Area like
	TOP1 TAGE light scattering light excitation opt cal propagation cloud chamber, bubble chamber, harmonic qualities.	101 (18) (18) (19)
1,	ARST ACT: The author considers the effects of radia ion of waves of doubled frequency when small inhomogenal les of an isotropic medium (re placed in an intense electropic field with sinusoidal	
10	periodicity. These effects /re connected with guadratic trans- verse polarization of the Praticles under the influence of the Lorentz force due to the interaction between the alternating dipole	新花园的
	moment of the inhomogeneity and the magnetic ligid of the wave.	1000 C
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	1 51299-65 EWT(1) IJP(c) ACCESSION NR: AP501366L	ID/0206/	25/001	
	AUTHOR: Askar'yan, G. A. ; Rabinov ch		Erra	/001/0009 (0015
	TITE: Light spank in a magnetic ite			30
0	SOURCE: Zhurnel eksperimentel noy i Prilozheniye, v. 1, no. 1, 1965, 9-15	eoreticheskov fiziki	Pis'ma	图 1 THE CARL COUNTY TO A COUNTY BOOK TO SHEET TO A COUNTY BOOK TO A COUNT
	TOPIC TAGS: (laser; laser induced spa controlled fusion reaction	k, laser air breakdown,	Laser	induced plasma,
	ABSTRACT: The first results of exper segnetic field are presented. The ma	otic field made it nos		
10.	the sperk-field interscilly as spoils	lamagnetic induction ai	mals,	and to study
	100 100 1000 mirror machines	ched laser was used in The most striking was	the e	periments The
	was the long duration of the diamegne Encodes, which was bracksted by lift 5 lives long. The mechanism of forsat	C DIBBES Of the older	ol se	reral micro-
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			Piery)	

"APPROVED FOR RELEASE: 06/05/2000 CIA-RDP86-00513R000102330011-0

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1	nergy it	ut. Orig. ert. bas: 4	o		sa lader] vith a higher [SK]
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	O RET	006		OTHER: 1003	ATD PRESS: 4014
	Ø 5	10.12.14.14.14.14.14.14.14.14.14.14.14.14.14.			

BT(1)/EPF(n)-2/190(n) ##-6/26-1//hb-10/P1-11 LIP(e/ ACCESSION NR: UR/0385/65/00:/(03/0044/0049 AP5014240 AUTHOR: Lakarlyan, G. A. TIVILE; Acceleration of particles by his edge field of a moving planne point that intensifies an electric field SOURCE: Zimrnal eksperimental nov i epreticheskov fiziki. Pis ma v redaktsiyu. Prilozheniya, v. 1, no. 3, 1965, 44-4 ; TOPIC TAGS: particle acceleration, a wing plasma, field effect, electric breakdown, discharge leader, plasmo loop-ABSTRACT: Although quasi-static electric fields are incapable of accelerating particles to energies above the field potentials, the author shows that by means of a moving inhomogeneity, which intensifies aquasi-static electric field, it is possible under certain conditions to obtain acceleration equivalent to many times the actually employed potential difference. It is demonstrated that the edge intensification of the field by merins of a point, a phenomenon dating back to the theories of the lightning arrester, of streamer propagation, etc., can be used effectively to accelerate particles or matter, provided the front of formation of propagation Cord 1/3

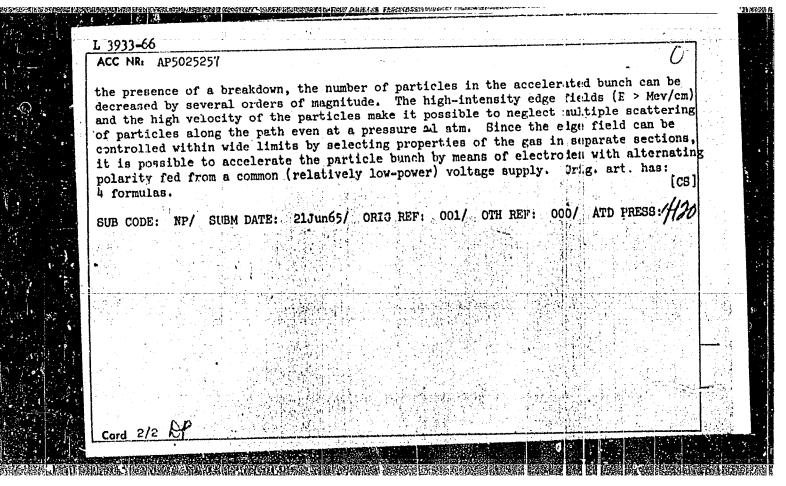
1 63563-65 ACCRESION NR: AP5014240 of the peak of the inhomogeneity ("point") moves to ther with the accelerated par-ticles: This can occur in those cases when the accelerated particles themselves constitute part of the inhomogeneity or produce it, or when the accelerated particles themselves initiate the creation of the inhomomogeneities by the field itself. Three specific cases are considered in detail: 1. Acceleration of the particles themselves in the edge of the inhomogeneity, where the inhomogeneity itself can be produced by a thin plasma jet escaping from an electrode (plasma gun, spark source, laser beam focused on the electrode, etc.). 2. Acceleration in which the particles move from one of the electrodes, leaving behind it a plasma loop (for example, as a result of heating the particle with a laser beam or ionization of the residual air by fast motion of the particle). 3.Acceleration of particles in a breakdown leader. The quadratic dependence of the accelerating force on the field intensity in the first of the above two processes and the possibility of modification of the field of the point by the properties of the gas in the third variant, make it possible to make multiple use of alternating electrodes of one high-voltage source for throughacceleration. The acceleration mode is light a nature, pulsed, since nonstationary processes are used. The described acceleration mechanism can arise when electric fields are used to draw out ions from a concentrated pulse-produced plasma. It is

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fast ions upon application	echanism plays an essential : of an electric field to s p r M. S. Rabinovich for a dis	lasmi of a hot vacuum spar	k.
work." Orig. art. has: 4	formulas. Institut Akademii nauk SSR	[os	
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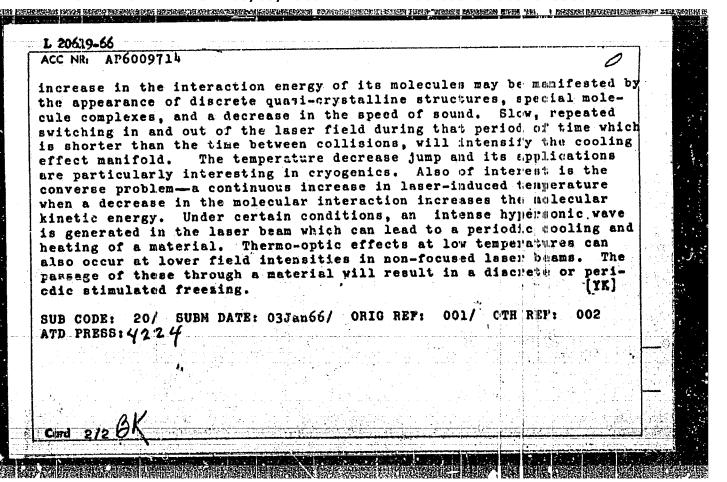
	L 64 54-65 EWA(E)/FBD/BVG 7)/EVT(1)/EPF(0)/EEC(1)-2/IPI(W)-2/T/EEC(b)-2/ACCEUSION NR: AN 5019591 SCTB/IJP(C) WC UR/03N5/65/001/006/0018/6023
	AUTHOR: Askar yen, G. A.; Rabinovich, M. S.; Savchenko, M. M. Smirnova, A. D.
	TITLE: Discovery of a fust photolonization halo and a cloud of concentrated long lived ionization from a shock wave of a breakdown in the laser beam 15 77 62
D. D	SOURIE: Zhurnal eksperimental hoy is teoreticheskoy filiki. Pis ma v redaktelyu B Prilozheniye, v. 1, no. 6, 1965, 18-23
	TOPIC IAGS: laser, breakdown, photoionization, ionization, plasma liser beam, multiphoton absorption, gas breakdown
	ABSTRACT: The results are presented of an experimental study of the onization halo produced during breakdown of a gas by a laser beam in he region of the breakdown.
	The laser beam from a Q-switched laser with a rotating prism was focused between a horn equipped with a detector and an antenna of an 8-mi oscillator by means of a
	lens with a 5-cm focal length. This arrangement made it rossible to make simultaneous measurements of the transmitted and reflected microwave radiation displayed on an oscilloscope. A comparison of the degree of attenuation of the microwaves deter-
	mined from the change in the detector current and the current corresponding to the voltage at the time of the appearance of the breakdown shows that microwave radia-
	Cord 1/2

な 64.53-65 ACCESSION NR: AP5019591 tion is strongly \issipated in the plasma of the halo. The lifetime of the plasma	
in the halo is relatively long, reaching hundreds of usec. The maximum attenuation occurs within a period loss than 5 usec after the breakdown. The authors also observed an ionization halo caused by radiation from the region heated by the laser beam, where the radiation is propagated ahead of the shock wave. The attenuation and scattering by this halo should increase with the wavelength of the hicrowave radiation. The high degree of ionization and heating due to photoconization and the slock wave near the region of the breakdown result in a relatively long lifetime of the plasma. Originart, has 2 figures:	
ASSOCIATION: Fizicheskiy institut im. P. N. Lebedera Akademii nauk SSSR (Physics Institute, Academy of Sciences SSSF)	
SUBMITTED: 10Mey65 ENCL: 00 SUB CODE: OP	
NO REF SOV: 002 OTHER: 002 ATD PRESS: 4065	
Card 2/2	

3933-66 ACC NR. AP5025257 UR/0386/65/002/004/0179/0182 AUTHOR: Askar yan, G. A. Sand resemble to the first the second ORG: Physics Institute im. P. N. Lebedev, Academy of Sciences, SSSR (Fizicheskiy institut TITLE: Self-acceleration of particles in an electric field of the polarized ionization SOURCE: Zhurnal eksperimental'noy i teoreticheskoy fiziki. Pis'ma v redaktsiyu. Prilozheniye, v. 2, no. 4, 1965, 179-182 31.440 TOPIC TAGS: plasma, gas, particle acceleration, ionization, breakdown, gas breakdown, ABSTRACT: A theoretical analysis is made of the possibility of acce was ing the particles passing through a medium by the edge field. The edge field is generated by the external field which polarizes the ionized trail left by the particles. Conditious for the acceleration of particles by the ionized trail are considered for the cases of the presence and the absence of breakdown. In the absence of breakdown and at a pressure of 1 atm, a frequency of interelectronic collisions 21011 sec-1, and with v/c f 1, the number of particles in the accelerated bunch required to achieve acceleration is N $\gtrsim 10^{12}$. Thus, at least in principle, it is possible to accelerate particles by such a method without a breakdown increase in the density of ionization in the medium. In



entable grander en variation en de de la compaction de la 60 AUTHOR: Askar'yan, G. A. 13 ORG: Physics Institute im. P. N. Lebedev, Academy of Sciences SSSR (Fizicheskiy institut) 21 TITLE: The thermo-optic effect in a laser beam SOURCE: Zhurnal eksperimental'noy i teoreticheskoy fizikil. redaktsiyu. Prilozheniye, v. 3, no. 4, 1966, 166-170 TOPIC TAGS: atomic interaction, thermo-optic effect, laser-induced cooling, cryogenics ABSTRACT: A laser beam which, as a rule, causes heating and disorganization of atoms when incident on the surface of a material, can also be used in certain cases to cool transparent materials. This effect is associated with an intensified interaction of internal atoms in a quasihomogeneous electromagnetic field. A mechanism is considered which explains changes in the kinetic energy of quasi-elastic atoms colliding in a homogeneous incremental electromagnetic field. Results indicate that the greater the number of molecules in a unit volume and the greater their polarizability, the greater the decrease in temperature. A discrete decrease in temperature of a material in a laser beam and an Card 1/2



	ACCESSION WR: AP5021572	UR/0:286/65/000/013/0045/0046 621.039.643
	AUTHOR: Askar'yan, G. A.: Delone, N. B.; Rabinov	世上 1 · 自身通常 1 · 之州等級的民
4	TITLE: A method of filling magnetic traps with a No. 172411	hot plasma. Class 21,
A section of the sect	SOURCE: Byulleten' izobrete iy i tovernykh znako	v, no. 13, 1965, 45-46
	TOPIC TAGS: laser, plasma, magnetic trap	
	ABSTRACT: The ionization and heating of a portion laser takes place in the magnetic field of the trin gas-dynamic scattering of the plasma. By incrinteraction of ions accelerated by electron pressure for obtaining the synthesis of high-temperature.	ap formed by fast ions produced easing the effectiveness of the ure, the effectiveness of the
	ASSOCIATION: none	
	SUBMITTED: 26Sep63 ENCLI 00	SUB CODE: EM, EC
	NO REP SOV: 000 OTHER: 000 Card 1/1	ATD PRISES: Y

Ty 25282-35 SWA(k)/EFT(1)/RPF(03/PBG(k)-2/RPA(w)-2/PBG(t)/T/RSF(Q)-2/BWP(k)/ BAX(5)-2 Pf-3/P3-4/P1-4/P0-4/Fr-4/Pab-10 TJP(o) JHB/NO/M

ACCESSION NR: AP5004403

5/0056/65/048/70L/0290/029Jy

AUTHOR: Askar'yan, G. A.; Rabinovich, M. S.

TITES Cascade lonization of a medium caused by an intense light Plash

SOURCE: Thurnal eksperimental now i theoreticheskoy fiziki, v. 48, co. 1, 1965, 290-294

TOPIC TAGS: laser, gas ionization, laser induced ionization, laser induced gas breakdown, focused light ionization, plasma acceleration

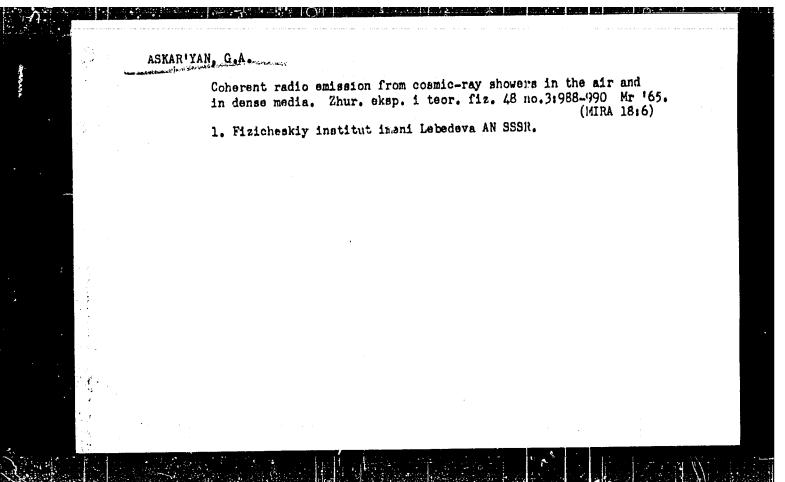
ABSTRACT: A theory of laser-induced gas breakdown is considered for the case of electric field intensities of the light beam greater than 107 v/cm. The theory is based on the cascade ionization concept, in which the field intensities involved have a high probability of ionizing atoms previously excited up to the second or third levels. Sufficient density of excited atoms is provided by interaction with electrons which have absorbed laser light quanta of the order of magnitude of 1 ev. Thus, the energy of the excited atoms is directly expended on the cascade development, giving it a high initial rise rate. For example, given an electric field intensity of 3·107 v/cm and an ionization potential of 10 ev, the cascade rise time will be 3·107 sec. The authors also consider the effect of an external magnetic field on the laser-induced spark in order to investigate the possibility of manipu-

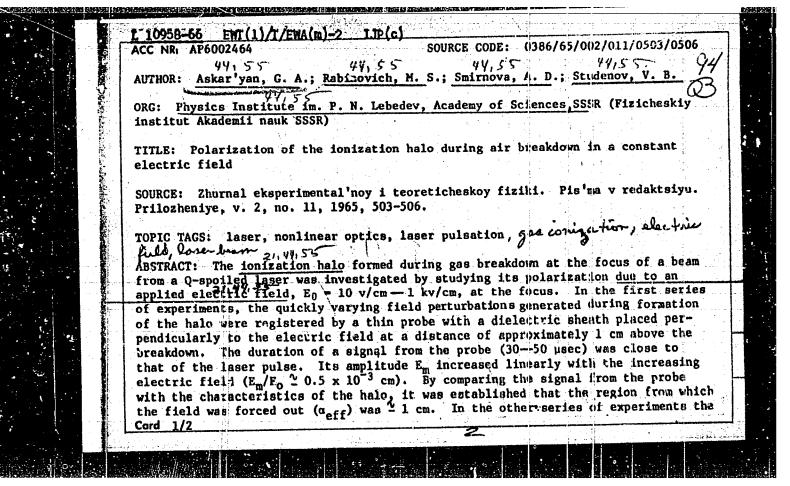
L 25282-65 ACCESSION NR: AP5004403 lating the resulting plasma. The inductive signal from the magnetic interaction is derived as a function of conductivity, dimensions, and expandion rate of the isser-produced plasma. The amail dimensions of the breakdown region allow end the Will fire that magnetic fields of the owner of the second Limited tradition of the romized material; these can in turn be utilized for various experiments, e.g., in controlled fusion reactions. Other effects of the cascade ionization process can lead to an enhanced absorption of high interdity light one to generate n of plasma trails in the path of intense light beams which so three or reflect ratio waves, in first first wall waves, et iomonas. ASSOCIATION: Pizicheskiy institut im. P. N. Lebedeva Akademii nauk SSSR (Physics Institute, Academy of Sciences, SSS 1) SUBMITTED: 10Ju164 ENCL: 00 SUI: CODE: EC ME NO REF SOV: Och OTHER: 002 ATI PRESS: 3184

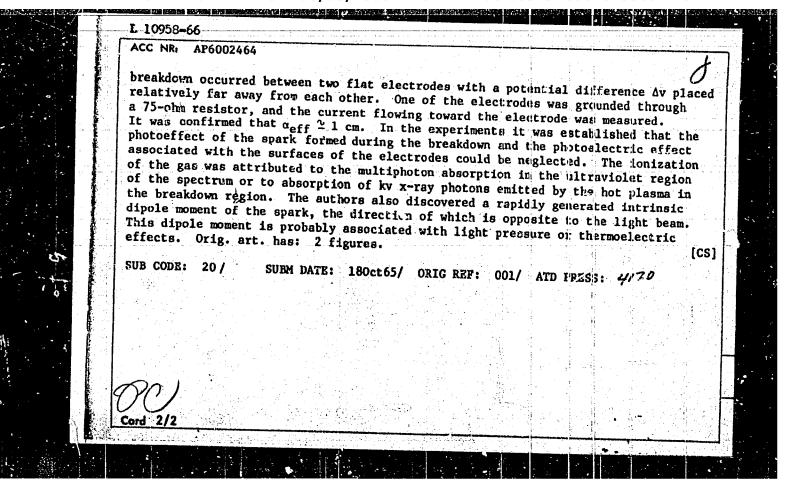
1	Enk(h) -Pn-4/P0-1/Pf-4/P1-4/P8b 1JP(c) Ch/JHB
	ACCESSION NR1 APSO06516 (7572)
	AUTHOR: Askar yan, G. A.
	minic. Strong excitation and dissociation of molecules in an intense
	erupen. Thurnal eksperimental nov i teoreticleskov fiziki, v , 48,
uni des passas mangal mangal	no. 2, 1965, 656-672 ropic TAGS: dissociation, wibration, laser field, coherent
	Tight, excitation, excitation probability, molecular physics, intense
	unumniam. Tualingian of Wibratival degrees of freedom of molecules
	and their dissociation in an interior and the second later and the used to
	calculate excitation and dissociation propagation on the funda-
	mental vibrarianal frequency (modulated light), are considered. The analyza
	and direct transition across states and the excitation and training and the excitation and training and train
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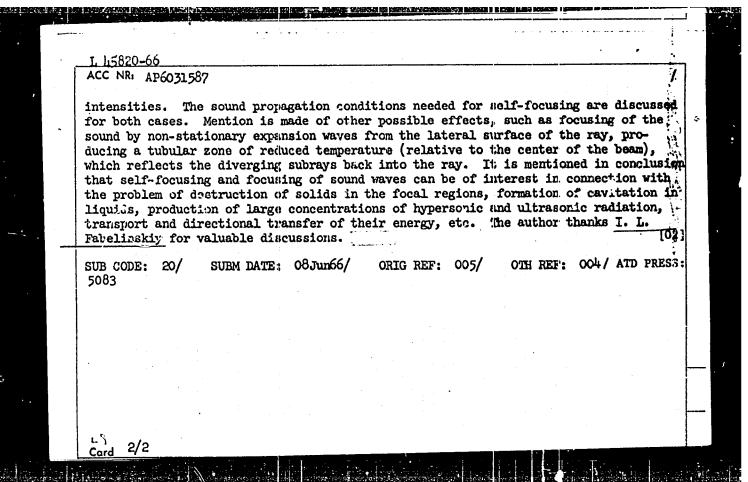
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		lissociation of molecules cambe accomplished by i	hten	e	ager radi	8-	
		ion. It is pointed out that resonant buildup of levet frequencies differing from those of incided	vibro L rac	tic	na la pos ioni Ori	8	
		ert. hast 32 formulas.			l C	8 1 2 3	
		ASSOCIATION: Fizicheskiy institut im, P. N. Lebed	eya l	ka	emii nauk		
	113.5	555R (Physics Institute, Acades) of Sciences, 655R)		्राह्म स्थानम्ब			
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1 2		[1985] [1985] [1985] [1985] [1985] [1985] [1985] [1985] [1985] [1985] [1985] [1985] [1985] [1985] [1985] [1985]	3	. ,			Q.







L և5820-66 EWT(1)/EWT(m)/T/EWP(k)/EWP(t)/ETI ACC NRI AP6031587 JD SOURCE CODE: UR/0386/66/004/004/0144/0147 AUTHOR: Askar yan. G. ORG: Physics Institute im. P. N. Lebedev, Academy of Sciences SSSE (Fizicheskiy B institut Akademii nauk SSSR) TITLE: Self-focusing and focusing of ultrasound and hypersound SOURCE: Zhurnal eksperimental noy i teoreticheskoy fiziki. Pin ma v redaktsiyu. Prilozheniye, v. 4, L. 4, 1966, 144-147 TOPIC TAGS: ultrasonic, propagation, hypersound propagation, self focusing, laser application, sound propagation ABSTRACT: The author points out the possibility of self-focusing and focusing of hypersonic rays from lasers or other sources, and estimates the conditions for the appearance and possible consequences of these effects. These effects are based on nonlinear processes that produce a differential in the properties of the medium inside and outside the sound ray, and are similar to self-focusing of electromagnetic rays! in media. Two particular cases are considered: 1. focusing of sound ray by the "wake" of a light ray, which modifies the properties of the medium clough to change the propagation of the sound wave medium through which the light has passed (the so called "wake" of the light ray). In dense media (liquids, solids) the speed of sound usually decreases when energy is released in the medium producing a wake that serves as a waveguide for the sound. 2. Self-focusing produced by the sound ray itself at high Card 1/2



J. 45778-66 EEC(k)=2/EWP(k)/EVT(1)/EVT(=)/T/EWP(e)ACC NRI AP6031986 SOURCE CODE: UR/0386/66/004/005/0177/0180 AUTHOR: Askar'yan, G. A.; Rabinovich, M. S.; Smirnova, A. D.; Stepanov, V. K.; Studenov, V. B. ORG: Physics Institute im. P. N. Lebedev, Academy of Sciences, SSSR (Fizicheskiy in- R stitut Akademii nauk SSSR) TITLE: Excitation of signals in a negatively charged post of an antenna under the influence of an unfocused laser beam 15 SOURCE: Zhurnal eksperimental'noy i teoreticheskoy fiziki. Pis'ma v redaktsiyu. Prilozheniye, v. 4, no. 5, 1966, 177-180 TOPIC TAGS: laser application, shf antenna, electron emission ABSTRACT: The authors describe the results of an investigation of current pulses produced when an unfocused laser beam strikes a metallic electrode or a post that serves as an antenna, on which a negative potential is applied. An ordinary Q-switched ruby laser was used, whose beam was aimed onto an antenna post located several meters away and under a negative voltage $U \approx 0$ - 3 kev. The antenna post was connected to ground through a capacitor and a resistor. The pulse picked off the resistor was fed through a capacitor and amplifiers (UR-3 and UR-4) to an Poscilloscope (S1.-10). The pulse induced in the antenna was commensurate in length with the duration of the laser flash. The pulse amplitude was at first approximately proportional to the voltage applied to the antenna but at a voltage 2 1 kv the magnitude of the signal increased sharply with 1/2 Card

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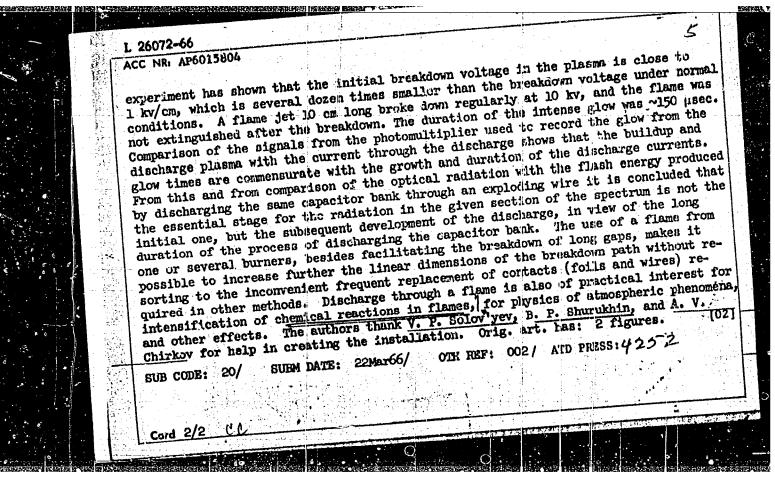
ACC NR: AP6031986

increasing voltage. No noticeable signals were registered at zero and positive potentials. The mechanism of the observed pulses is shown to be connected with the current produced when the electrons knocked out by the laser radiation are removed from the post. The production of free electrons may be connected with the photoeffect from the oxidized surface (if the surface is clean, the laser quantum energy is insufficient to produce the photoeffect), with the heating of the electrons on the surface of the metal upon absorption of the laser light, with a burst of photoelectric field emission, or with a cascade. If the role of the light were to consist of facilitating the cold emission under the influence of the field, or if cascade multiplication of the electrons in the gas at the post were to take place, then the dependence of the current on the voltage should be much stronger. It is possible that some of the foregoing processes are responsible for the intensification of this dependence at sufficiently large field intensities. When the gas pressure around the antenna decreases, the electron mobility increases and the voltage needed to remove the electrons can be small. The described effect can be used for remote excitation of receiving and transmitting antennas with the aid of a guided laser beam, to register and measure laser radiation power, etc. Orig. art. has: 2 figures and 1 formula.

SUB CODE: 20, 09/ SUBM DATE: 16Jun66 / ATD PRESS: 5084

Card 2/2

I PON BOURDATA SERSINA DA MITATA IL LA MANDA MANDA MATANA PARANCA PARANCA EMP(j)/EWI(1)/EWI(m)/ETC(m)-6/T RM/DS/VW/JW ACC NR. AP6019804 SOURCE CODE: UR/0386/56/003/010/0404/5407 AUTHOR: Askar yan, G. A.; Gol'ts, E. Ya.; Rabinovich, M. S.; Shuderov, V. B. ORG: Physics Institute im. P. N. Lebedev, Academy of Sciences (ISSR (Fizicheskiy & institut Akademii n. ik SSSR) TITIE: Electric breakdown through a flame SOURCE: Zhurnal eksperimental'noy i teoreticheskoy fiziki. Pin'ma v redaktsiyu. Prilozheniye, v. 3, no. 10, 1966, 404-407 TOPIC TAGS: electric discharge, dielectric breakdown, flame, discharge plasma, exploding wire ABSTRACT: To investigate electric breakdown through a flame with an aim at obtaining data of value to gas-discharge physics, shock-wave production under laboratory conditions, and for production of intense flashes, cumulative collapses, pinches, etc. at atmospheric pressures without surrounding the discharge with chumber walls, the authors discharged a bank of five capacitors of 150 µF each, charged to 5--10 kv, through a vacuum discharge gap into a flame plasma. The discharge development was recorded by a high-speed camera (SFR). The flash of light was recorded with a photomultiplier and its energy measured with a special calorimeter. The current flowing through the plasma was measured with a Rogowski loop and reached several hundred ka. A vertical flare jet was produced by a burner using a mixture of illuminating gas and oxygen. The temperature of such a flame usually does not exceed 2000°. One electrode was the body of the burner, and the other was a high-melting-point metal rod. The Card 1/2



ADMINISTRAL HEAVEN DESCRIPTION OF THE TOTAL STREET STREET

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ACC NR: AP6620790 SOURCE CODE: UR/0386/65/003/012/0465/0468

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TITLE: Fast overlap of microwave radiation by an ionization aureole of a spark in a laser beam

SOURCE: Zhurnal eksperimental'noy i teoreticheskoy fiziki. Pis'ma v redaktsiyu.

Prilozheniye v. 3, no. 12, 1966, 465-468

TOPIC TAGS: gas ionization, ionization phenomenon, ionized plasma, microwave plasma, SPARK SHOCK WAVE, LASER BEAM

ABSTRACT: This is a continuation of earlier investigations (Pis'ma ZhETF v. 1,

ABSTRACT: This is a continuation of earlier investigations (Pis'ma ZhETF v. 1, no. 6, 18, 1965) of the ionization aureole behind the shock wave of a light spark in a laser beam. The present study deals with chorter times (tens and hundreds of nanoseconds), when the ionization leads the shock wave from the spark. The spark from a Q-switched laser beam was flashed in front of a radiating antenna fed from an 8-mm magnetron. The receiving antenna was placed either behind the spark (in aureole overlap investigations) or at different angles (in reflection investigations). The area of the microwave radiation overlap by the aureole was

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determined by comparing the overlap signal at different distances from the spark to the antenna axis and found to have a radius of 1.5 - 2 cm. The values of the reflection signals at different large angles, including back reflection, were commensurate with the overlap signal. This shows that the scattered radiation is due not only to the absorption diffraction, but also to the high reflectivity of the aureole plasma. The electron density in the latter is estimated to be ~10¹³ cm⁻³, which is two orders of magnitude higher than the intensity obtained by the authors from polarization measurements (Pis'ma ZhETF v. 2, 503, 1965). The sparks and ionization aureoles differed for different gases (air, oxygen, argon, nitrogen, helium, hydrogen). The high speed of the strong overlap of radiation by the fast aureole after a time ~10 nsec, and the large overlap area, suggest that the fast aureole may be useful for sharp overlap, modulation, or diversion of microwave beams. The authors thank D. K. Akulina and A. D. Smirnova for valuable advice, and L. Kolomeytsey for help with the work. Orig. art. has: 2 figures. [02]

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Card 2/2 (C)

ACC NR: AP7000536

SOURCE CODE: UR/0386/66/004/010/0400/0403

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TITLE: Self-focusing of a light beam upon excitation of the atoms and molecules of the medium in the beam

SOURCE: Zhurnal eksperimental'noy i teoreticheskoy fiziki. Pis'ma v redaktsiyu. Prilozheniye, v. 4, no. 10, 1966, 400-403

TOPIC TAGS: excited state, light excitation, laser beam, laser r and d, self focusing

ABSTRACT: The author points out that the vibrational, rotational, and electronic excitation of the molecules and atoms of a medium in which a powerful light beam passes, and disintegration of their associations under the influence of the light beam or processes accompanying it, can contribute to the self-focusing of the beam. The excitation of the atom or molecule makes its electronic structure more friable and increases the polarizability. For example, electronic excitation of a very simple atom to the n-th level increases its dimensions by n² times and its polarizability by n³ times, so that the polarizability can increase by a factor ~10² - 10³ even when n = 2 - 3, and still more in the case of resonance levels. When rotational or vibrational motions are excited in the molecule, the increase in its optical polarizability is smaller, but this can result in a noticeable change in the dielectric constant

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ACC	2956-67 EAT(1)/EEG(K)-2/T/EWF(K) IJF(c) NG/AT NR: AT6033038 SOURCE CODE: UR/2504/66/032/000/0089/0096	
rua	MOR: Askar'yan, G. A.; Rabinovich, M. S.	
1 .	: Physics Institute im. P. N. Lebedev (Fizicheskiy institut)	
!	LE: Ionization of a medium and production of plasma by a laser beam	
	RCE: AN SSSR. Fizicheskiy institut. Trudy, v. 32, 1966. Fizika plazmy (Plasma sics), 89-96	
TOP pla	IC TAGS: laser, laser beam, laser beam effect, ionization, medium ionization, sma production, plasma trapping, production, plasma trapping, production,	
solu "pre ioni	ation of numerous problems in plasma physics. The review is considered eliminary," since it deals with a new field. The first section discusses avalanche engths of 107 y/cm or over. The record and is concerned with field	Ļ
the hot act high	possible effects on such plasma by external inhomogeneous magnetic fields. The plasma's diamagnetism makes it possible for an inhomogeneous magnetic field to upon it by accelerating the ionized clouds or throwing it into a trap. A very field strength 105 to 106 oe) applied to small plasma clouds can produce emely high ejection speeds which can be employed for various plasma and pre-	
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thermonuclear processes. The third and fourth sections concern magnetic traps. The advantages of action of intense light upon dense matter placed directly in a magnetic trap are discussed. The steep characteristic of the dependence of ionization rate of rarefied gas on the intensity of light makes it possible, by increased intensity of the light beam (of about 500 Mw), to ionize fast particles (e.g., 108 cm/sec) with a probability close to unity. The most advantageous method would be action upon molecular ion beams directed into the trap. The analysis of the processes involved also shows the advantages of using higher harmonics, polarized atoms, and light beams modulated by half the natural frequency of the atoms in the molecule, and by various resonance manipulations of the pumping field.

SUB CODE: 20/ SUBM DATE: none/ ORIG REF: 007/ OTH REF: 006/ ATD PRESS: 5099

Card 2/2 20

ACC: NR: AP7001340

SOURCE CODE: UR/0386/(6/04/011/0453/0456

AUTHOR: Askar'yan G. A.; Gol'ts, E. Ya.; Rabinovich, M. S.

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TITLE: Use of artificial meteors for laser pumping

SOURCE: Zhurnal eksperimental'noy i teoreticheskoy fiziki. Pis'ma v redaktsiyu. Prilozheniye, v. 4, no. 11, 1966, 453-456

TOPIC TAGS: laser pump, mhd shock wave, mhd generator, ammunition projectile

ABSTRACT: In connection with recently published reports of the use of the energy of an explosion or a flame jet for laser pumping, the authors discuss certain possibilities of using artificial meteors (rapidly moving bodies accelerated by gunshot) to pump medium-power lasers. It is estimated that the energy of a shot from a modern weapon ranges from several kJ (ordinary rifle) to several hundred kJ (cannon) and that at a repetition frequency of 10 - 30 shots per second and an efficiency ~1% this would yield 10 J - 1 kJ. The mechanism of converting the bullet energy into pump energy may be provided either by the flash of light produced by the compression wave in front of the bullet, or by magnetohydrodynamic generation of electric energy by the bullet. In the former case, a bullet maintained at -3 km/sec over a path length of ~1 m can produce a sufficiently intense pump flash, especially if it moves through a jet of gas having high emissivity. In the mhad case, the electric energy is produced by induc-

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